TOPIC 7 USEFUL TABLES AND DATA

7.1 The Periodic Table

Group	I	II		III	IV	V	VI	VII	VIII
Period 1									2 He
Period 2	3 Li	4 Be		5 B	6 C	7 N	8 O	9 F	10 Ne
Period 3	11 Na	12 Mg	transition elements	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
Period 4	19 K	20 Ca	21 Sc 22 Ti 23 V 24 Cr 25 Mn 26 Fe 27 Co 28 Ni 29 Cu 30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
Period 5	37 Rb	38 Sr	39 Y 40 Zr 41 Nb 42 Mo 43 Tc 44 Ru 45 Rh 46 Pd 47 Ag 48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
Period 6	55 Cs	56 Ba	71 Lu 72 Hf 73 Ta 74 W 75 Re 76 Os 77 Ir 78 Pt 79 Au 80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
Period 7	87 Fr	88 Ra	103 Lr 104 Rf 105 Db 106 Sg 107 Bh 108 Hs 109 Mt 110 111 112	113	114	115	116	117	118

1 H

lanthanides: 57 La, 58 Ce, 59 Pr, 60 Nd, 61 Pm, 62 Sm, 63 Eu, 64 Gd, 65 Tb, 66 Dy, 67 Ho, 68 Er, 69 Tm, 70 Yb

actinides: 89 Ac, 90 Th, 91 Pa, 92 U, 93 Np, 94 Pu, 95 Am, 96 Cm, 97 Bk, 98 Cf, 99 Es, 100 Fm, 101 Md, 102 No

typical elements

Table 7.1 The Periodic Table.

7.2 The Greek alphabet

Table 7.2 The Greek alphabet.

Name	Lower case	Upper case	Name	Lower case	Upper case
Alpha	α	A	Nu (new)	ν	N
Beta (bee-ta)	β	B	Xi (cs-eye)	ξ	Ξ
Gamma	γ	Γ	Omicron	o	O
Delta	δ	Δ	Pi (pie)	π	
Epsilon	ε	E	Rho (roe)	ρ	P
Zeta (zee-ta)	ζ	Z	Sigma	σ	Σ
Eta (ee-ta)	η	H	Tau	τ	T
Theta (thee-ta – 'th' as in theatre)	θ	Θ	Upsilon	υ	Y
Iota (eye-owe-ta)	ι	I	Phi (fie)	φ	Φ
Kappa	κ	K	Chi (kie)	χ	X
Lambda (lam-da)	λ	Λ	Psi (ps-eye)	ψ	Ψ
Mu (mew)	μ	M	Omega (owe-me-ga)	ω	Ω

7.3 Selected physical constants and unit conversions

Table 7.3 SI fundamental and derived units.

Quantity	Unit	Abbreviation	Equivalent units
mass	kilogram	kg	
length	metre	m	
time	second	s	
temperature	kelvin	K	
angle	radian	rad	
area	square metre	m^2	
volume	cubic metre	m^3	
speed, velocity	metre per second	$m\,s^{-1}$	
acceleration	metre per second squared	$m\,s^{-2}$	
density	kilogram per cubic metre	$kg\,m^{-3}$	
frequency	hertz	Hz	(cycles) s^{-1}
force	newton	N	$kg\,m\,s^{-2}$
pressure	pascal	Pa	$kg\,m^{-1}\,s^{-2}$, $N\,m^{-2}$
energy	joule	J	$kg\,m^2\,s^{-2}$
power	watt	W	$kg\,m^2\,s^{-3}$, $J\,s^{-1}$
specific heat capacity	joule per kilogram kelvin	$J\,kg^{-1}\,K^{-1}$	$m^2\,s^{-2}\,K^{-1}$
thermal conductivity	watt per metre kelvin	$W\,m^{-1}\,K^{-1}$	$m\,kg\,s^{-3}\,K^{-1}$

Table 7.4 Selected physical constants and preferred values.

Quantity	Symbol	Value
speed of light in a vacuum	c	$3.00 \times 10^8 \, \mathrm{m\,s^{-1}}$
Planck constant	h	$6.63 \times 10^{-34} \, \mathrm{J\,s}$
Boltzmann constant	k	$1.38 \times 10^{-23} \, \mathrm{J\,K^{-1}}$
gravitational constant	G	$6.67 \times 10^{-11} \, \mathrm{N\,m^2\,kg^{-2}}$
Stefan–Boltzmann constant	σ	$5.67 \times 10^{-8} \, \mathrm{W\,m^2\,K^{-4}}$
Avogadro constant	N_A	$6.02 \times 10^{23} \, \mathrm{mol^{-1}}$
molar gas constant	R	$8.31 \, \mathrm{J\,K^{-1}\,mol^{-1}}$
charge of electron	e	$1.60 \times 10^{-19} \, \mathrm{C}$ (negative charge)
mass of proton	m_p	$1.67 \times 10^{-27} \, \mathrm{kg}$
mass of electron	m_e	$9.11 \times 10^{-31} \, \mathrm{kg}$
Astronomical quantities:		
mass of the Sun	$M\odot$	$1.99 \times 10^{30} \, \mathrm{kg}$
radius of the Sun	$R\odot$	$6.96 \times 10^8 \, \mathrm{m}$
photospheric temperature of the Sun	$T\odot$	$5770 \mathrm{K}$
luminosity of the Sun	$L\odot$	$3.84 \times 10^{26} \, \mathrm{W}$
astronomical unit	AU	$1.50 \times 10^{11} \, \mathrm{m}$

Table 7.5 Some useful conversions from alternative unit systems to SI units.

Quantity	Unit	SI equivalent
angle	1 degree	$(\pi/180) \, \mathrm{radians}$
pressure	1 bar	$10^5 \, \mathrm{pascals}$
temperature	$1\,°\mathrm{C}$	$1\mathrm{K}$
energy	1 erg	$10^{-7} \, \mathrm{joules}$
	1 electron volt	$1.60 \times 10^{-19} \, \mathrm{J}$
	1 ton of TNT	$4.18 \times 10^9 \, \mathrm{J}$
length	1 foot	$0.305 \mathrm{m}$
	1 mile	$1.61 \mathrm{km}$
area	1 square inch	$6.45 \times 10^{-4} \, \mathrm{m^2}$
	1 square mile	$2.59 \times 10^6 \, \mathrm{m^2}$
mass	1 pound	$0.454 \mathrm{kg}$
speed, velocity	1 mile per hour	$0.447 \, \mathrm{m\,s^{-1}}$